Heating digester with programmable increases of temperature

Operation Manual for models:
DK 6 – DK 20 – DK 6/48 – DK 20/26 – DK 42/26 – DK8

IMPORTANT:
READ THE INFORMATION CONTAINED IN THE PRESENT MANUAL BEFORE USING THE UNIT. THE MANUFACTURER DOES NOT ACKNOWLEDGE ANY RESPONSABILITY FOR AN IMPROPER USE OF THE EQUIPMENT, NOT RESPONDING TO DIRECTIONS FOR USE.

The labels applied to the unit warn the user on the dangers to which he is exposed during the use or the maintenance. The labels must be left on the unit and substituted if they are no more readable.

Warn of danger
Read carefully the Safety Regulations here below

Caution hot surface!

Do not dispose of this equipment as urban waste

This unit must only be used for laboratory applications

SAFETY RULES
1) The heating plate if programmed, may reach a temperature of 450°C, this happens during the heating phase but also during the cooling phase.
2) The containers and the products used during the work must be compatible with the temperature set on the unit.
3) For applications where the digestion process produces fumes, acid gases or corrosive substances (e.g. the Kjeldahl method), the instrument should be combined with specific fumes suction and abatement systems. See Velp's models JP fume suction pump code F30620198 and SMS scrubber code F307C0199.

CLEANING
Always unplug the unit before cleaning. The heating plate must be cool. Use a damp cloth and not flammable, not aggressive detergents.

PERSONAL PRDTECTION EQUIPMENT
The equipment used for personal protection must be compatible with the possible dangers deriving from the working materials and from the glass vessels.

MAINTENANCE
According to the law on products guarantee our instrument must be repaired at our factory, save different agreements with our agents. For more information see the "Maintenance" Chapter in this manual. The instrument must be transported in its original packaging and any indications present on the original packaging must be followed (e.g. palletised).

GUARANTEE
Starts from the date of our invoice for 25 months. The guarantee decades if the unit is not used in compliance with what is written in this operating manual (see chapter 4) and if the quantity of the reagent is not in compliance with the normal using of the instrument.
N.B.: *The manufacturer is committed to constantly improving the quality of the products and reserves the right to modify the characteristics without prior notice.*

CONTENTS

1. Introduction

The Velp Scientifica heating blocks (thermoreactors) are designed for wet digestions of liquid or solid samples. The usual amount of sample is up to 15 ml or 5 g. The DK6, DK8 and DK20 models can hold rispectively up to 6, 8 and 20 test tubes Ø 42 mm. The DK6/48 model can hold up to 6 test tubes Ø 48 mm while DK20/26 and DK42/26 models can hold rispectively up to 20 and 42 test tubes Ø 26 mm.
The duration of digestion is related to sample nature and to the adopted method.
The temperature range varies from room temp. to 450°C.
With the Velp Scientifica digesters, working conditions are totally reproducible and safe as well as reducing the consumption of reactives and saving space.

2. Instrument description

The structure is manufactured from stainless steel and protected by special resins and paints purposely studied and tested to assure a strong resistance to chemical or mechanical agents.

The heating block is manufactured from an aluminium alloy which allows an optimal temperature homogeneity at all the selectable temperatures.The temperature of the heating block is controlled by a microprocessor with PID logic. The temperature probe is a Pt100 platinum probe which does not require a calibration because at each turning on the electronics performs a self calibration.
All this allows a good precision and reproducibility of performed tests.
The instrument is equipped by a sophisticated electronics aimed to simplify as much as possible its use exploiting fully the power of software.

The use of the equipment is controlled by only four keys which allow an easy entering of all the functions during programming or normal use.
Each window shown by the display gives the description of the controls that will be developed when the key evidenced on the corresponding line will be pressed.
This allows to enter four principal menus.

The **PROGRAM MENU** allows to select up to 20 work programs. For each work program it is possible to select up to four temperatures and the relative time of permanence: When a work program is started the set temperatures will be developed sequentially. The selectable temperatures span from room to 450°C.
The time of permanence at a selected temperature spans from 001 to 999 minutes. If the time is set to 000 the corresponding temperature is not developed. It is possible to select a continuous operation.
The **PRINT MENU** allows to collect the data related to the performed tests and then to send them to a computer for their storage according to **Good Laboratory Practice (GLP)**. After the storage the data can be printed.

The **LANGUAGE MENU** allows to choose the language by which the information is shown on the display. It is possible to select one of the following five languages: Italian, English, German, French, Spanish and Turkish.

The **SYSTEM MENU** allows the choice of unit for the temperature shown by the display (°C or °F). it is possible to modify the data (day) and time (hour) and to choose the data format that will be reported on the data transmission file.

The instrument is equipped by a protection against over temperatures by a thermostat with manual resetting. The sensitive element located on the heating block breaks the power supply when a temperature higher than 500°C is noticed. The manual resetting is located on the rear panel by pressing the little shaft.

DK20 and DK42/26 models guarantee unmatched savings whist ensuring an extremely high level of reliability.
Thanks to the new TEMS™ technology, you will obtain considerable benefits in:
Time: rapid heating reduces wasted time
Energy: reduction in power consumption thus cutting CO2 emissions
Money: huge cost reduction per single analysis
Space: the narrow footprint saves valuable laboratory bench space

3. Control of the instrument when received

The delivered instrument is complete of:
- Power cable
- Instruction manual

NOTE: *Keep the special shock-resistant packing material for future use.*

4. Installation

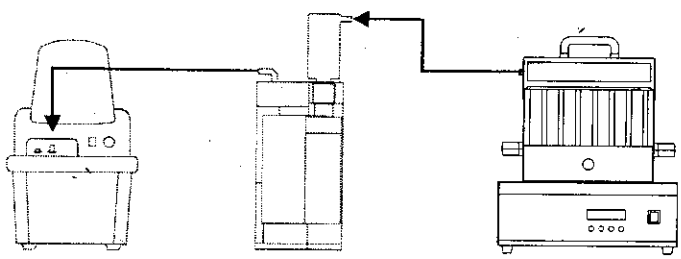
Connect the unit to electric supply according to the values reported on label.
Ensure that the electric main is provided of earth protection.

Note
The first few times the unit is turned on, the heating block may produce a small quantity of fumes. These fumes are harmless and are caused by the drying-off of the various materials present.

For applications where the digestion process produces fumes, acid gases or corrosive substances (e.g. the Kjeldahl method), specific accessories are required (see Chapter 9 "Accessories") as well as fumes suction and abatement systems.

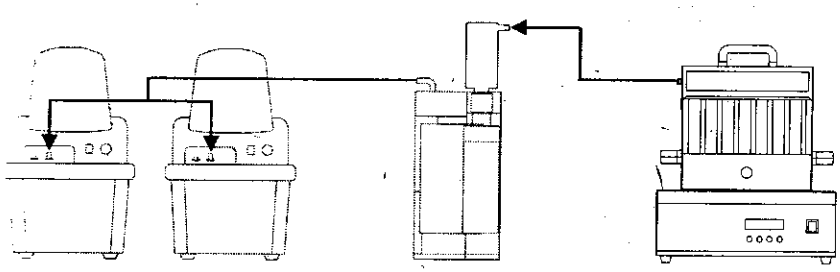
Velp Scientifica offers the following systems:
JP recirculating water pump for fumes aspiration (code F30620198)
SMS Scrubber (cod. F307C0199)
If the above mentioned instruments and the accessories aren't used in these applications, the terms of guarantee won't be valid anymore.

Diagram showing how to connect the various instruments



JP Jet Pump SMS Scrubber DK digester

When using DK42/26 digester, Velp suggests to use 2 JP (for the connection refer to the below scheme) in order to guarantee an effective fumes removal.



JP Jet Pump JP Jet Pump SMS Scrubber DK digester

5. Operation controls

5.1 Description of control board

The control board is composed by a lighted main switch, a display with 32 characters on two lines and by four keys.

Lighted main switch	Feeds the unit	
Key Esc	Out of a work cycle	Return to the window of upper level or menu
	During a work cycle	Stops the cycle

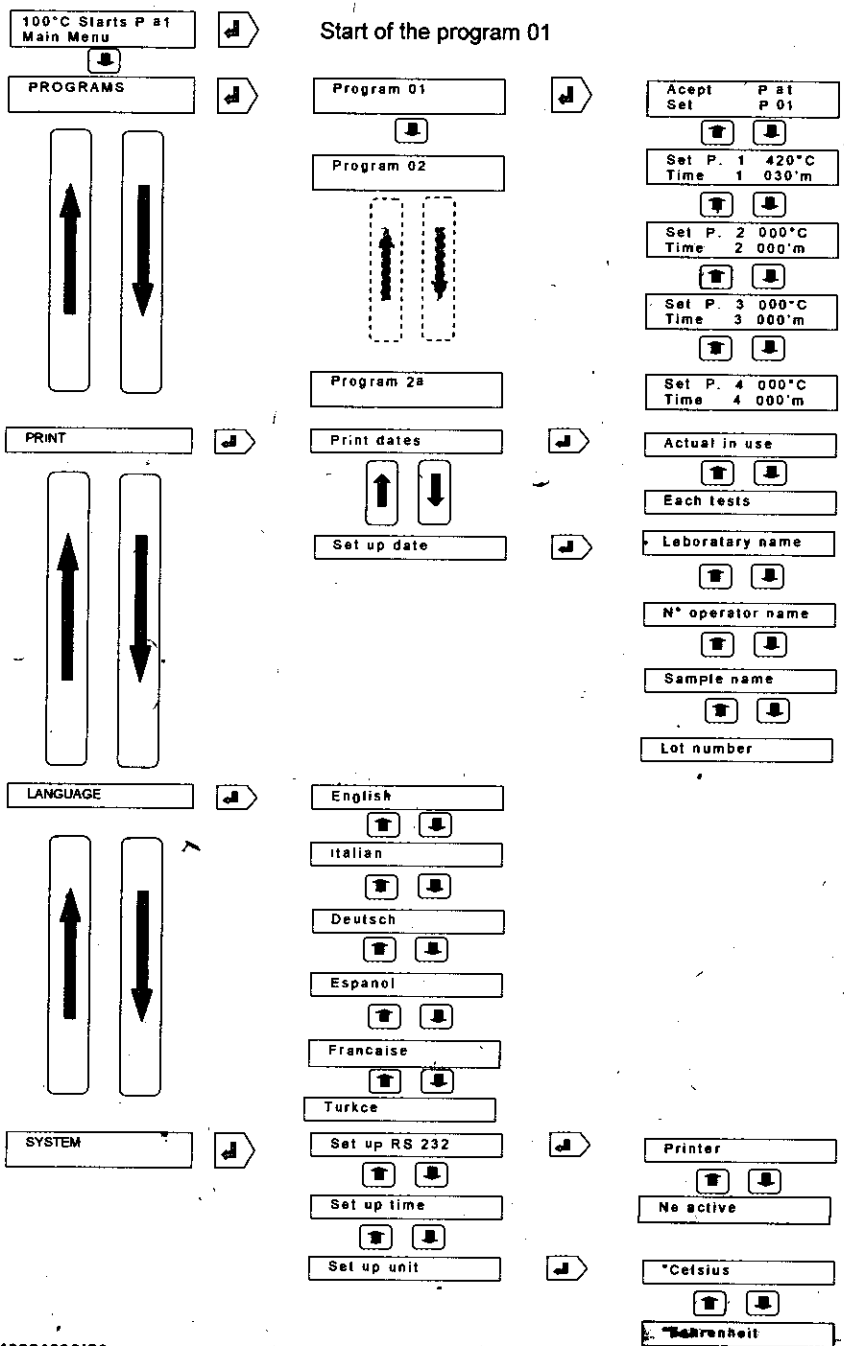
Key ↑	Out of a work cycle	Shows in sequence the windows of the selected menu
	In the setting windows	Increases the shown value
	During a work cycle	No effect

Key ↓	Out of work cycle	Shows in sequence the windows of the selected menu
	In the setting windows	Lowers the shown value
	During a work cycle	No effect

Key ↵	In the main window	Starts the shown program
	Out of a work cycle	Enters the menu or the selected setting window
	In the setting windows	Confirms the displayed value
	During the count of time of a work cycle	Changes the operation to continuous.

5.1.1 Rapid guide

This page shows the software of the heating block. The purpose is to help the user to identify the different possibilities of the instrument and how to reach them easily.



5.2 Main menu

When the instrument is turned on by the main switch the display shows during some seconds the type of instrument and the version of installed software.

		D	i	g	e	s	t	e	r					
		V	e	r	s	i	o	n		1	.	0		

Then the display shows the main window:

1	0	0	°	C		S	t	a	r	t		P	0	1	↵
M	a	i	n		M	e	n	u							↓

The first line shows the number of the program in use (the last used).

The start of a cycle is obtained by pressing the key ↵.
The second line shows that by pressing the key ↓ the main menu is entered.

The main menu is composed by the following windows (subjects) which can be selected by the keys ↓ and ↑:

	P	R	O	G	R	A	M	S						↵
<														>

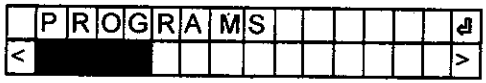
P	R	I	N	T										↵
<														>

L	A	N	G	U	A	G	E							↵
<														>

S	Y	S	T	E	M									↵
<														>

Pressing the key Esc it returns to the window of upper level or menu.

5.3 Program menu



The program menu allows to select the desired program or to set four temperature and time values for each program.
They will be performed sequentially from 1 to 4.

5.3.1 Selection of program

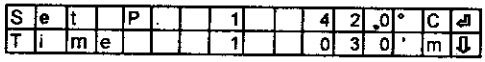
If the fore-cited PROGRAM window is confirmed by the key ↵ the display will show:

20 available programs can be selected by the keys ↓ and ↑.
When the desired program is confirmed by the key ↵ the display shows:

Now it is possible to confirm the parameters of the visualized program and to return to the main window for the start of the cycle or to enter into the visualization and setting of parameters by the key ↓ .

5.3.2 Visualization of values

When the key ↓ is pressed 4 windows are presented in succession and for each window it is possible to program the work parameters, i.e. temperature and the corresponding time of permanence. The four work ramps will be performed in succession when the corresponding program is started.
If a time is set to 000 the ramp is not active and will not be performed.



5.3.3 Setting of values

If the temperature and time of the four work ramps are to be varied the corresponding window is to be visualized and the key ↵ is to be pressed.
The temperature value will blink and its value can be modified by the keys ↓ and ↑

S	e	t				1			⇩	4	2	0	⇧	C	↵
T	i	m	e			1				0	3	0	'	m	

Confirm the desired value by the key ↵. The display will show:

S	e	t				1				4	2	0	°	C	↵
T	i	m	e			1			⇩	0	3	0	⇧	m	

The time value will blink and its value can be modified by the keys ↓ and ↑.
Confirm the desired value by the key ↵.

Note
The different ramps will be developed in succession from n°1 to n°4.
Consequently it is suitable to program temperature values increasing from n°1 to n°4. If this criterion is not respected during programming the display will show:

E	R	R	O	R			S	e	t		n	o	t		
s	e	q	u	e	n	t	i	a	l						

5.4 Print menu

P	R	I	N	T											↵
<															>

The instrument is predisposed for the serial connection RS232, by the socket located on the rear panel, for printing or storing data according to **Good Laboratory Practice (G.L.P.)**. This menu allows to choose the sending of data for every performed program or only after a specific request. It is also possible to set the data related to the examined products and the parameters utilized for each test.

The print menu is composed by the following sub-menus:

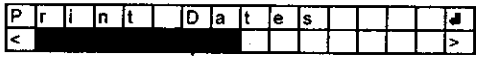
P	r	i	n	t		D	a	t	e	s					↵
<															>

S	e	t		u	p		D	a	t	e	s				↵
<															>

5.4.1 Data printing

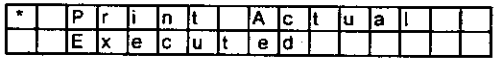
The data can be printed or stored on a file in two different ways:

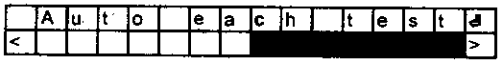
- Printing or storing of data on request
- Printing or storing of data at the end of each work cycle



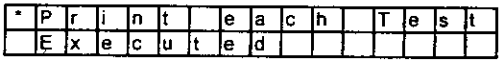
If this window is confirmed another menu is entered which defines when the file is to be transmitted:

Pressing the key ↵ for this window the display shows the following writing for some seconds an at the same the file is sent to the computer.



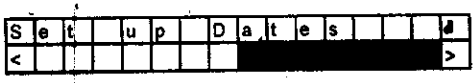


If the window "all the tests" is selected and confirmed by the key ↵ the print file will be transmitted every time a work program is concluded while the display will show for some seconds:

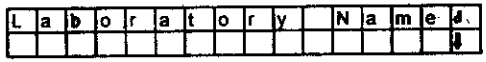


Pressing the key Esc it returns to the window of upper level or menu.

5.4.2 Setting of data



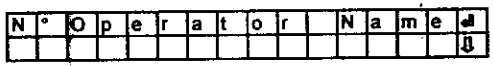
By confirming this window it is possibile to enter the setting of parameters related to the developing tests. The following windows will be shown in succession:

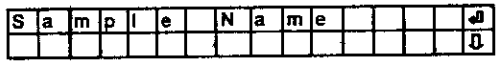


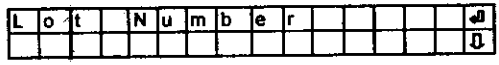
Press the key ↵ to set or modify the content of a window. A dark square corresponding to the first letter of text.
The keys ↓ and ↑ allow the change of content. Each letter or number is to be confirmed by the key ↵.

It is possible to introduce 16 characters in the lower line.

The same procedure is to be used for the following windows.







When the setting of all the windows is finished press Esc to return to the window of upper level or menu.

5.4.3 Setting a printer or a PC serial interface

It is possible to store the information related to the performed tests by connecting a printer or a PC by the serial 9 pin socket located on the rear.
If a PC is connected it is possible to use the Hyper Terminal program installed in the software Microsoft Windows 95-98-2000.
The settings of the PC serial connection must be the following:

Baud rate	4800
Data length	8
Parity	None
Bit of Stop	1
Handshaking	None - Xon/Xoff

Connection to a PC:
For the connection to a PC use a standard cable RS232 with 9 pin with female-male connectors.

Connection to a printer:
For the connection to a printer use a serial cable RS232 with 9 pin with female-male connectors inverting the wires of the pin 2 and 3 on one connector only.

5.4.4 Transmission file

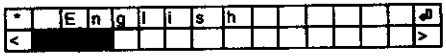
The file contains the following information:

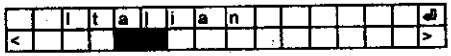
DIGESTER VERSION 1.0		Heading of default report
Program N°	01	Program in use
Day (dd/mm/yy)=19/12/00 Hour (hh:mm)=14:53		Data settable in the menu **System/Date setting**
Laboratory name	Velp Scientifica	Data settable in the menu **Print \ Data setting**
Operator's n° and name	012 Mario Rossi	
Sample name	Milk	
Lot number	00125	

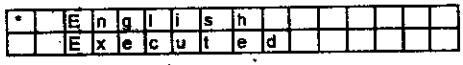
Set 1	420°C	Time 1	30 min	Parameters set in the used program
Set 2	000°C	Time 2	000 min	
Set 3	000°C	Time 3	000 min	
Set 4	000°C	Time 4	000 min	

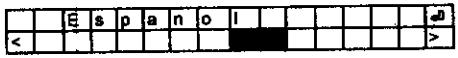
5.5 Language menu

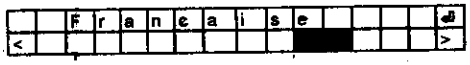
This menu allows the selection of the language used to display the different information. It is possible to select five languages: Italian, English, German, French, Spanish and Turkish.
Select the chosen language and confirm by the key ↵

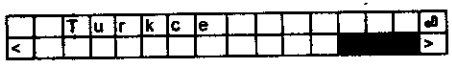










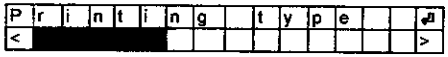


To return to the upper window press the key Esc

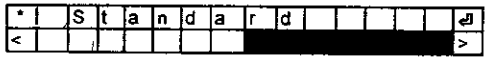
5.6 System menu

This menu allows to select the temperature unit shown by the display (°Celsius and °Fahrenheit). It is possible to set day and hour and hour and to choose the data format that will be reported on the data transmission file.

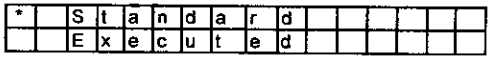
5.6.1 Printing type

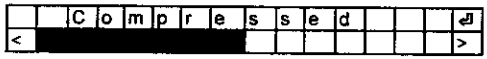


It's possibile to set the data format to be printed in the transmission file

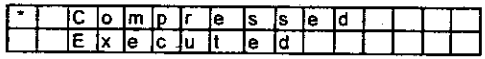


If this window is confirmed by the key ↵, the display will show for some seconds the following message and the instrument is predisposed for sending the data to the serial interface, as indicated in the scheme of the chap. 5.4.4.





On the contrary if the last window is confirmed by the key ↵, the display will show for some seconds the following message and the instrument is predisposed for sending the data to the serial interface as following scheme:



DIGESTER VERSION 1.0

Program 01

Day (dd/mm/yy)=19/12/00 Hour (hh:mm)=14:53

Laboratory name	Velp Scientifica
Operator's n° and name	012 Mario Rossi
Sample name	Milk
Lot number	00125

Set 1	420°C
Time 1	30 min
Set 2	000°C
Time 2	000 min
Set 3	000°C
Time 3	000 min
Set 4	000°C
Time 4	000 min

Use this format when the Velp printer (code A00001009) is connected to the unit.

To return to the upper window press the key Esc

5.6.2 Setting date and hour

S	e	t		u	p		T	i	m	e				↵
<														>

Allows to set the running day and hour. If it is confirmed by the key ↵ the following window will be shown:

	D	a	t	e						T	i	m	e	↵	
2	4	/	1	0	/	2	0	0	0	1	4	:	1	6	

Day Month Year Hour Minute

If the data are to be modified the key ↵ is to be pressed again. Thus the first value will start to blink. It can be modified by the keys ↓ and ↑.

	D	a	t	e						T	i	m	e		
2	4	/	1	0	/	2	0	0	0	1	4	:	1	6	

To return to the upper window press the key Esc

5.6.3 Setting of unit

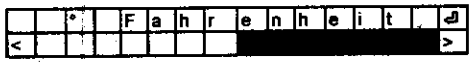
S	e	t		u	p		U	n	i	t					↵
<															>

By selecting this window it is possible to change the temperature unit shown by the display, choosing °C (Celsius) or °F (Fahrenheit). The choice is to be confirmed by the key ↵.

*		°		C	e	l	s	i	u	s					↵
<															>

*		°		C	e	l	s	i	u	s					
		E	x	e	c	u	t	e	d						

Or:



By pressing he key ↵ the display will show for some seconds the confirmation window as for presented.

Note
The numerical range for setting the temperature varies according to the used unit.

Numerical range as °Celsius:	from 10°C to 450°C
Numerical range as °Fahrenheit:	from 51°F to 842°F

When the change of temperature unit is performed the instrument changes automatically in the various programs the Set point temperatures into the new units.

6. Start

To start a work cycle select the desired program and press the key ↵ of the main window. The instrument keeps memorized the last used program and when turned on the main window shows the last number of program used.

0	2	0	°	C		S	t	a	r	t		P	0	1	↵
M	a	i	n		M	e	n	u							⇩

If the key ↵ is pressed the program n°1 (P01) starts and the display shows::

Block temperature Set temperature

0	2	5	⇨	1	°		S	e	t	⇨	1	5	0	°	C
0	0	0		T	i	m	e				0	3	0	'	m

when the temperature of the heating block reaches the value of the first active set (set time different from 000) an acoustic signal warns about the reaching of temperature and the time count start. The display will show:

1	5	0		1	°		S	e	t		1	5	0	°	C
0	0	0	⇨	T	i	m	e			⇨	0	3	0	'	m

Passed time Set time

At the end of the set time the instrument starts to perform the following ramp:

1	5	0		2	°		S	e	t		1	5	0	°	C
0	0	0	⇨	T	i	m	e			⇨	0	3	0	'	m

If no other active ramp is present in the work program the instrument stops the heating and warns by an acoustic signal. The end of cycle is also displayed during some seconds.

	E	N	D		O	P	E	R	A	T	I	N	G		
					C	Y	C	L	E						

If during the count down of time in any ramp the key ↵ is pressed the unit will operate continuously at the Set temperature value and the display shows:

1	5	0		1	°		S	e	t		1	5	0	°	C
0	0	0	⇨	T	i	m	e			⇨	0	3	0	'	m

If the key Esc is pressed he work cycle is interrupted.

Note:
When a new program is started, if the temperature of heating block is higher than the first active set the work cycle will not start and the display shows:

		N	O	T		R	E	A	D	Y				
T	e	m	p	e	r	a	t	u	r	e	>	S	e	t	

In the case the start of the new cycle is possible only after the cooling of the heating block below the first active value.

STOPS

When a black out or lack of power occurs the instrument keeps the running condition. When the power is again available the work cycle starts from the point of interruption.

Important:
Before start analysis check that the glass parts of suction cap, are aligned with the test tubes and sample rack.

Note:
If you do not use all the positions of the digester, use the accessory A00000243 "Glass cap" for empty positions, placing it in the sample rack.

7. Maintenance

The instrument does not require any ordinary or extraordinary maintenance. Only a periodical cleaning is suggested as described by this manual.

7.1 Replacement of fuses

The instrument is equipped by two fuses located under the socket on the rear side. To replace a fuse, first unplug the unit and then open the fuse box by levering the cover with a screwdriver.

8. Disposing of the unit

The instrument is classified as electrical/electronic apparatus and must be disposed of accordingly. The unit is subject to waste separation and cannot be disposed of as urban waste under EEC directive 2002/96/CE. For more information please contact the relative division of your local town council.

9. Accessories

The "Operating Accessories" available upon request, are necessary for the correct functioning of the instrument.

DK 6:

Operating Accessories

N° 2	Test tubes Ø 42x300 mm, 250 ml, 3 pcs/box	**A00000144****
N° 1	Sample rack with heat shields	**A00001111**
N° 1	Fume suction cup	**A00001096**
N° 1	Support system	**A00001206**

Optional Accessories

N° 1	Stainless steel drop collector	**A00001200**
N° 1	Stainless steel stand for sample rack	**A00001097**
N° 1	Printer	**A00001009**
N.°1	Serial Cable	**A00000005**
N.°1	Null modem connector for printer	**A00000010**
N.°1	IQ/OQ Manual DK	**A00000075**
	Glass cap	**A00000243*****

Accessories for C.O.D. analysis

N° 2	COD test tubes for Ø 42x200 mm, 200ml with cone NS 29/32, 3 pcs/box	**A00000145***
N° 6	Air refrigerators with ground cone	**A00001041***
N° 6	PTFE sheats for 29/32 cones	**A00001042***
N° 6	Antisplash bells	**A00001045***
N° 1	Stainless steel stand sample rack for COD	**A00001049**

** Code number refers to one single piece*
** Code number refers to one single box*
**** Use one piece for each empty position*

DK 20:

Operating Accessories

N° 7	Test tubes Ø 42x300 mm, 250 ml, 3 pcs/box	A00000144**
N° 1	Sample rack for DKL20-DK20	A00000168
N° 1	Suction cap and drip tray DKL20-DK20	A00000169
N° 1	Support system DK20-DK42/26	A00000190

Optional Accessories

N° 1	Stand for DKL-DK20 DKL-DK42/26	A00000182
N° 1	Printer	A00001009
N.°1	Serial Cable	A00000005
N.°1	Null modem connector for printer	A00000010
N.°1	IQ/OQ Manual DK	A00000075
	Glass cap	A00000243***

Accessories for C.O.D. analysis

N° 7	COD test tubes Ø 42x200 mm, 200ml with cone NS 29/32, 3 pcs/box	A00000145**
N° 20	Air refrigerators with ground cone	A00001041*
N° 20	PTFE sheats for 29/32 cones	A00001042*
N° 20	Antisplash bells	A00001045*
N° 1	Glassware handle for COD	A00000237

** Code number refers to one single piece*
** Code number refers to one single box*
**** Use one piece for each empty position*

DK 6/48:

Operating Accessories

N° 6	Glass test tubes diam. 48x250mm high	A00001088*
N° 1	Sample rack with heat shield	A00001113
N° 1	Fume suction cup	A00001101
N* 1	Support system	A00001206

Optional Accessories

N° 1	Stainless steel drop collector	A00001200
N° 1	Stainless steel stand for sample rack	A00001097
N° 1	Printer	A00001009
N.°1	Serial Cable	A00000005
N.°1	Null modem connector for printer	A00000010
N.°1	IQ/OQ Manual DK	A00000075

** Code number refers to one single piece*

DK 20/26:

Operating Accessories

N° 4	Test tubes Ø 26x300mm, 100 ml 6 pcs/box	**A00000146****
N° 1	Stainless steel sample rack	**A00001110**
N° 1	Fume suction cup	**A00109626**
N° 1	Support system	**A00001206**

Optional Accessories

N° 1	Stainless steel stand for sample rack	**A00001097**
N* 1	Printer	**A00001009**
N.°1	Serial Cable	**A00000005**
N.°1	Null modem connector for printer	**A00000010**
N.°1	IQ/OQ Manual DK	**A00000075**

** Code number refers to one single piece*

DK 42/26:

Operating Accessories

N° 7	Test tubes Ø 26x300mm, 100 ml 6 pcs/box	**A00000146****
N° 1	Sample rack for DKL42/26-DK42/26	**A00000180**
N° 1	Suction cap and drip tray DKL-DK42/26	**A00000179**
N* 1	Support system DK20-DK42/26	**A00000190**

Optional Accessories

N° 1	Stand for DKL-DK20 DKL-DK42/26	**A00000182**
N° 1	Printer	**A00001009**
N.°1	Serial Cable	**A00000005**
N.°1	Null modem connector for printer	**A00000010**
N.°1	IQ/OQ Manual DK	**A00000075**

** Code number refers to one single piece*

DK 8:

Operating Accessories

N° 3	Test tubes Ø 42x300 mm, 250 ml, 3 pcs/box	**A00000144****
N° 1	Stainless steel sample rack	**A00000063**
N° 1	Fume suction cup	**A00000065**
N° 1	Support system	**A00000064**

Optional Accessories

N° 1	Stainless steel stand for sample rack	**A00000067**
N° 1	Printer	**A00001009**
N.°1	Serial Cable	**A00000005**
N.°1	Null modem connector for printer	**A00000010**
N.°1	IQ/OQ Manual DK	**A00000075**
	Glass cap	**A00000243*****

** Code number refers to one single piece*
**** Use one piece for each empty position*

9.1 How to verify the temperature of the heating block

The electronic control of temperature allows a good stability without over temperatures or oscillations around set point. The probe used for the measurement of temperature is a Pt100 which allows a high precision.
The probe does not require a calibration because every time the instrument is turned on the internal software of the microprocessor performs a self calibration.
Anyway if a control is required it is possible to measure the temperature of the heating block introducing an original Velp Scientifica thermometer into the hole located in the upper part of the block.

Code Art. 10000282 mercury thermometer 0÷250°C

10. Spare parts

DK 6:

VELP code	**F30100182**	**F30110182**
Power supply (V/Hz)	**230/50-60**	**115/50-60**
Fuse	**10000669** (2x 8A)	**10000671** (2x 12A)
Foot 17Dx16H for screw	**10000238**	**10000238**

DK 20:

VELP code	**F30100350**
Power supply (V/Hz)	**2300/50-60**
Fuse	**10000678** (2x 15A)
Foot 17Dx16H for screw	**10000238**

DK 6/48:

VELP code	**F30100188**	**F30110188**
Power supply (V/Hz)	**230/50-60**	**115/50-60**
Fuse	**10000669** (2x 8A)	**10000671** (2x 12A)
Foot 17Dx16H for screw	**10000238**	**10000238**

DK 20/26:

VELP code	**F30100185**	**F30110185**
Power supply (V/Hz)	**230/50-60**	**115/50-60**
Fuse	**10000669** (2x 8A)	**10000671** (2x 12A)
Foot 17Dx16H for screw	**10000238**	**10000238**

DK 42/26:

VELP code	**F30100360**
Power supply (V/Hz)	**230/50-60**
Fuse	**10000678** (2x 15A)
Foot 17Dx16H for screw	**10000238**

DK 8:

VELP code	**F30100020**	**F30180020**
Power supply (V/Hz)	**230/50-60**	**115/50-60**
Fuse	**10000670** (2x 8A)	**10003086** (2x 15A)
Foot 17Dx16H for screw	**10000238**	**10000238**

11. Technical features

DK 6: 6 holes Ø 42 mm

General:		Code F30100182	Code F30110182
Power supply	V/Hz	230/50-60	115/50-60
Power	W	1.100	
Weight	kg	10	
Dimensions (WxHxD)	mm	293x152x339	
Hole diameter	mm	42 x n°6 holes	
Display		Lighted LCD with 2 lines and 16x2 characters	
Language selection		N° 6: I –UK – F- E – D - TK	
Temperature unit		°C o °F	
Thermoregulation		P.I.D. microprocessor	
Temperature precision	%	± 0.2 end of scale	
Temperature probe		Pt 100 class A	
Temperature calibration		Automatic by software	
Environmental temp. range	°C	5÷40	

Programs:		
Selectable programs	n°	20
Work ramps for each program	n°	1 ÷ 4
Selectable temperatures	°C/°F	10 ÷ 450°C / 51 ÷ 842°F
Temperature selection	°C/°F	1
Selectable times	min.'	from 001 to 999
Selection of time	min.'	1
Continuous operation		Possible

Performance:		
Speed of heating from 20°C to 420°C	min.'	30
Stability of temperature	°C	± 0,5
Homogeneity of temperature.	°C	± 0,5
Precision of temperature	°C	± 0,5

Safeties:	
Against over temperatures	Thermostat with manual reset
Probe out of service	Displayed by the software

Interface	
Serial	RS232 (9 pin)

DK 20: 20 holes Ø 42 mm

General:		Code F30100350
Power supply	V/Hz	230/50-60
Power	W	2.300
Weight	kg	17,4
Dimensions (WxHxD)	mm	328x138x510 mm
Hole diameter	mm	42 x n°20 holes
Display		Lighted LCD with 2 lines and 16x2 characters
Language selection		N° 6: I –UK – F- E – D - TK
Temperature unit		°C o °F
Thermoregulation		P.I.D. microprocessor
Temperature precision	%	± 0.2 end of scale
Temperature probe		Pt 100 class A
Temperature calibration		Automatic by software
Environmental temp. range	°C	5÷40

Programs:		
Selectable programs	n°	20
Work ramps for each program	n°	1 ÷ 4
Selectable temperatures	°C/°F	10 ÷ 450°C / 51 ÷ 842°F
Temperature selection	°C/°F	1
Selectable times	min.'	from 001 to 999
Selection of time	min.'	1
Continuous operation		Possibile

Performance:		
Speed of heating from 20°C to 420°C	min.'	50
Stability of temperature	°C	± 0,5
Homogeneity of temperature.	°C	± 0,5
Homogeneity of temperature	°C	± 0,5

Safeties:	
Against over temperatures	Thermostat with manual reset
Probe out of service	Displayed by the software

Interface	
Serial	RS232 (9 pin)

DK 6/48: 6 holes Ø 48 mm

General:		code F30100188	Code F30110188
Power supply	V/Hz	230/50-60	115/50-60
Power	W	1.100	
Weight	kg	8.2	
Dimensions (WxHxD)	mm	293x152x339	
Hole diameter	mm	48 x n°6 holes	
Display		Lighted LCD with 2 lines and 16x2 characters	
Language selection		N° 6: I –UK – F- E – D - TK	
Temperature unit		°C o °F	
Thermoregulation		P.I.D. microprocessor	
Temperature precision	%	± 0.2 end of scale	
Temperature probe		Pt 100 class A	
Temperature calibration		Automatic by software	
Environmental temp. range	°C	5÷40	

Programs:		
Selectable programs	n°	20
Work ramps for each program	n°	1 ÷ 4
Selectable temperatures	°C/°F	10 ÷ 450°C / 51 ÷ 842°F
Temperature selection	°C/°F	1
Selectable times	min.'	from 001 to 999
Selection of time	min.'	1
Continuous operation		Possibile

Performance:		
Speed of heating from 20°C to 420°C	min.'	30
Stability of temperature	°C	± 0,5
Homogeneity of temperature.	°C	± 0,5
Homogeneity of temperature	°C	± 0,5

Safeties:	
Against over temperatures	Thermostat with manual reset
Probe out of service	Displayed by the software

Interface	
Serial	RS232 (9 pin)

DK 20/26: 20 holes Ø 26 mm

General:		Code F30100185	Code F30110185
Power supply	V/Hz	230/50-60	115/50-60
Power	W	1.100	
Weight	kg	10	
Dimensions (WxHxD)	mm	293x152x339	
Hole diameter	mm	26 x n°20 holes	
Display		Lighted LCD with 2 lines and 16x2 characters	
Language selection		N° 6: I –UK – F- E – D - TK	
Temperature unit		°C o °F	
Thermoregulation		P.I.D. microprocessor	
Temperature precision	%	± 0.2 end of scale	
Temperature probe		Pt 100 class A	
Temperature calibration		Automatic by software	
Environmental temp. range	°C	5÷40	

Programs:		
Selectable programs	n°	20
Work ramps for each program	n°	1 ÷ 4
Selectable temperatures	°C/°F	10 ÷ 450°C / 51 ÷ 842°F
Temperature selection	°C/°F	1
Selectable times	min.'	from 001 to 999
Selection of time	min.'	1
Continuous operation		Possible

Performance:		
Speed of heating from 20°C to 420°C	min.'	30
Stability of temperature	°C	± 0,5
Homogeneity of temperature.	°C	± 0,5
Homogeneity of temperature	°C	± 0,5

Safeties:	
Against over temperatures	Thermostat with manual reset
Probe out of service	Displayed by the software

Interface	
Serial	RS232 (9 pin)

DK 42/26: 42 holes Ø 26 mm

General:		Code F30100360
Power supply	V/Hz	230/50-60
Power	W	2.300
Weight	kg	18,2
Dimensions (WxHxD)	mm	328x138x510 mm
Hole diameter	mm	26 x n°42 holes
Display		Lighted LCD with 2 lines and 16x2 characters
Language selection		N° 6: I –UK – F- E – D - TK
Temperature unit		°C o °F
Thermoregulation		P.I.D. microprocessor
Temperature precision	%	± 0.2 end of scale
Temperature probe		Pt 100 class A
Temperature calibration		Automatic by software
Environmental temp. range	°C	5÷40

Programs:		
Selectable programs	n°	20
Work ramps for each program	n°	1 ÷ 4
Selectable temperatures	°C/°F	10 ÷ 450°C / 51 ÷ 842°F
Temperature selection	°C/°F	1
Selectable times	min.'	from 001 to 999
Selection of time	min.'	1
Continuous operation		Possible

Performance:		
Speed of heating from 20°C to 420°C	min.'	50
Stability of temperature	°C	± 0,5
Homogeneity of temperature.	°C	± 0,5
Homogeneity of temperature	°C	± 0,5

Safeties:	
Against over temperatures	Thermostat with manual reset
Probe out of service	Displayed by the software

Interface	
Serial	RS232 (9 pin)

DK 8: 8 holes Ø 42 mm

General:		Code F30100020	Code F30180020
Power supply	V/Hz	230/50-60	115/50-60
Power	W	1.350	
Weight	kg	10,80	10,90
Dimensions (WxHxD)	mm	235x152x448	
Hole diameter	mm	42 x n°8 holes	
Display		Lighted LCD with 2 lines and 16x2 characters	
Language selection		N° 6: I –UK – F- E – D - TK	
Temperature unit		°C o °F	
Thermoregulation		P.I.D. microprocessor	
Temperature precision	%	± 0.2 end of scale	
Temperature probe		Pt 100 class A	
Temperature calibration		Automatic by software	
Environmental temp. range	°C	5÷40	

Programs:		
Selectable programs	n°	20
Work ramps for each program	n°	1 ÷ 4
Selectable temperatures	°C/°F	10 ÷ 450°C / 51 ÷ 842°F
Temperature selection	°C/°F	1
Selectable times	min.'	from 001 to 999
Selection of time	min.'	1
Continuous operation		Possible

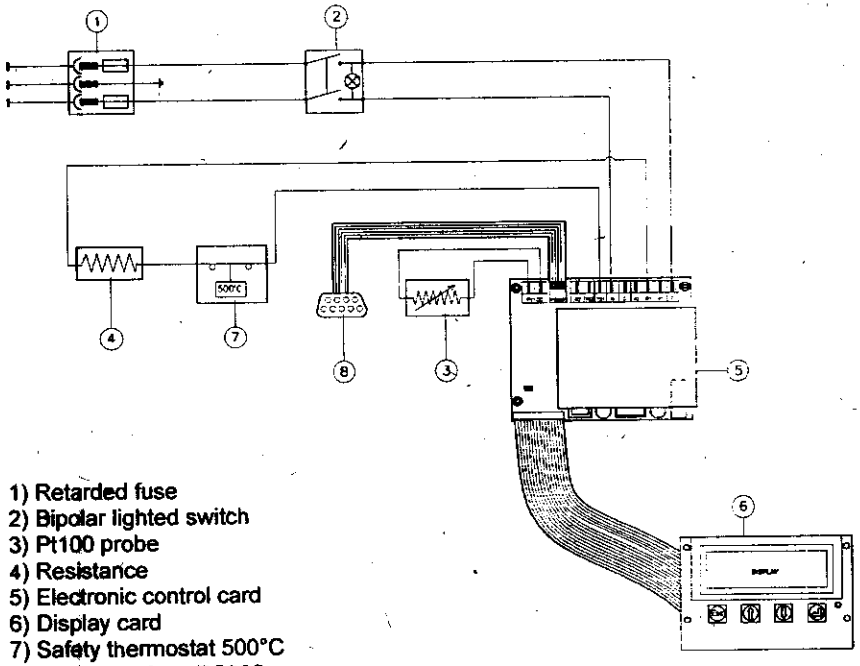
Performance:		
Speed of heating from 20°C to 420°C	min.'	35
Stability of temperature	°C	± 0,5
Homogeneity of temperature.	°C	± 0,5
Precision of temperature	°C	± 0,5

Safeties:	
Against over temperatures	Thermostat with manual reset
Probe out of service	Displayed by the software

Interface	
Serial	RS232 (9 pin)

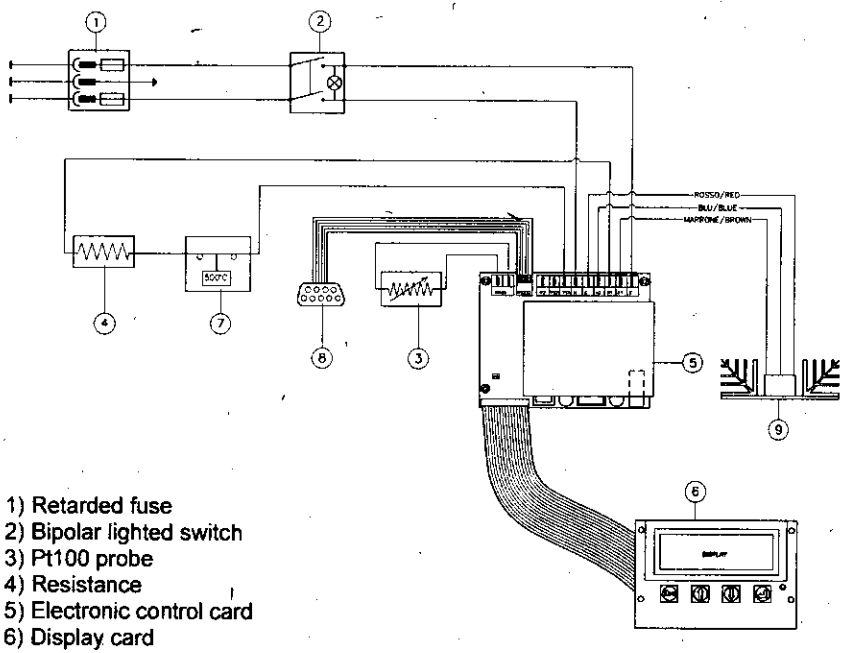
12. Electric scheme

DK 6 – DK 6/48 – DK 20/26 - DK 8 (230V):



1) Retarded fuse
2) Bipolar lighted switch
3) Pt100 probe
4) Resistance
5) Electronic control card
6) Display card
7) Safety thermostat 500°C
8) Serial interface RS232

DK 20 – DK 42/26 – DK 8 (115V):



1) Retarded fuse
2) Bipolar lighted switch
3) Pt100 probe
4) Resistance
5) Electronic control card
6) Display card
7) Safety thermostat 500°C
8) Serial interface RS232
9) Power triac

Declaration of conformity CE

We the manufacturer VELP SCIENTIFICA s.r.l.
Address Via Stazione, 16
20865 USMATE (MB)
Italy

under our responsibility declare that the product is manufactured in conformity with the following standards:
EN 61010-1 (2001)
EN 61326-1/2013
2011/65/EU (RoHS)
2012/19/UE (RAEE)

and satisfies the essential requirements of the following directives:
Machinery directive 2006/42/EC
Low voltage directive 2014/35/EU
Electromagnetic compatibility directive 2014/30/EU
plus modifications and that the documents listed in annex I are available at Velp's offices as foreseen by the machinery directive.

Warranty

The unit is guaranteed against production defects for 25 months from our invoice date.

Warranty claims can be made only if the system has been installed and used as specified on the manual and carried out by qualified service personnel as appointed by VELP Scientifica.

In accordance with this guarantee VELP SCIENTIFICA undertakes to repair any units resulting as faulty due to the quality of the materials used or poor workmanship.

Units rendered faulty due to inexpert handling/use or carelessness will not be replaced or repaired under warranty.

For more details please contact your Distributor.

Exclusions:
The guarantee will be considered null and void for faults resulting from:
- inexperience and carelessness of the operator
- repairs, maintenance or replacement of parts carried out by personnel or Companies not authorized by the manufacturer
- use of the instrument that does not comply to the instructions/recommendations given in the present operating manual
- use of non-original spare parts

Thank you for having chosen a VELP product !

Since 1983 Velp has offered to professionals in the sector a range of sophisticated and reliable equipment with excellent operating capacity and backed by high levels of know-how at competitive prices.
Velp works according to **ISO 9001**, **ISO14001** and **OHSAS 18001** Quality System Certification. Instruments are built according to the International norms IEC 1010-1 and to the rules of the CE mark.

Let us present our product Lines:

Environment

Thermoreactors ECO series
B.O.D. Determination systems
Refrigerated thermostats
Cooled Incubators
Flocculators
Overhead mixer
Mineralization system for heavy metals trace determination
Turbidimeter
Radiation Detector

Stirring

Heating magnetic stirrers
Vertex digital thermoregulator
Ultraflat magnetic stirrer
Magnetic stirrers
Overhead stirrers
Heating plates
Vortex mixers
Homogenizer

Food&Feed

Digesters DK series
JP Recirculating Water Pump for fumes aspiration
SMS Scrubber
Distillation Unit UDK series
Solvent extractors
Raw fiber extractors
Dietary fiber extractors
Laboratory aids
Oxitest Oxidation Test Reactor

Pumps

Recirculating water vacuum pump
Peristaltic pumps